REMARKS

Claims 1, 4-13, 15-34, and 39-42 are pending in this application. Claims 2-3, 14, and 35-38 have been cancelled. Claims 1, 10, 20, and 28 have been amended in this response. Claims 39-42 have been added. Claims 1, 10, and 20 are the independent claims in this case. It is believed that no new matter has been added by this amendment.

The Applicants note that the Examiner has not indicated the status for Claims 33-34 in her last Office Action. These two dependent claims were pending at the time of the last Office Action. However, the Examiner did indicate that these two dependent claims were rejected on her index of claims document dated November 15, 2007 on PALM. The Applicants request the Examiner to provide the basis of her rejection for these two claims if the Examiner does not allow the claims of the current case in the next Office Action.

Claims 1, 4-13, and 15-32 are rejected as follows: Claims 1-3, 4-13, and 15-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 5,864,641 to Murphy et al. ("Murphy") in view of U.S. Patent Application Publication No. 2003/0146109 to Sailor et al. ("Sailor") and further in view of U.S. Patent Number 5,377,008 to Ridgway et al ("Ridgway"). In view of the amendments and remarks presented herein, the undersigned respectfully traverses these rejections as set forth below. The undersigned will address each independent claim separately as the Applicants believe that each independent claim is separately patentable over the prior art of record.

Rejection of Independent Claim 1

It is respectfully submitted that Murphy, Sailor, and Ridgway, individually or in view of each other, fail to describe, teach, or suggest the combination of: (1) obtaining a first sample from the environment; (2) introducing the first sample to at least one detection module; (3) filtering the first sample through at least a first filter and a second filter which are part of the at least one detection module, (4) wherein the first filter and the second filter comprise porous Bragg gratings, (5) further wherein the first filter contains at least one detection molecule for binding the target agent thereto and the second filter contains no detection molecules for binding the target agent thereto; (6) measuring an optical property of the first filter and the second filter after filtering the first sample there through; (7) comparing the measured optical property of the

first filter to the measured optical property of the second filter to determine a presence of the target agent; (8) measuring an optical property of a third filter which is not exposed to the first sample, (9) the third sample comprising a porous Bragg grating; and (10) comparing the measured optical property of the third filter to the measured optical property of the first and second filters to determine a presence of spurious signals caused by the environment, as recited in amended independent Claim 1.

Support for the third filter comprising a porous Bragg grating; and comparing the measured optical property of the third filter to the measured optical property of the first and second filters to determine a presence of spurious signals caused by the environment can be found in paragraphs [0065] and [0066] of the original application as filed.

The Office Action fails to establish a prima facie case of obviousness for amended Claim 1. The Office Action does not show how the combination of the cited references teach each and every element of the claims as currently amended.

Murphy

Murphy describes a waveguide core 20 as illustrated in Figure 1 reproduced below which interacts with the long period grating 40 and is converted into a number of modes contained within the waveguide cladding 30. These cladding modes propagate over short distances in the cladding 30 before being attenuated by the boundary between the cladding and the protective coating 80 and bends in the fiber. A reactive coating 60 is disposed on the cladding 30 in an operable relationship to the long period grating 40 such that the reactive coating is chemical in nature and has exposed active sites 70 which are oriented away from the fiber. When coupling occurs, the long period grating produces a wavelength transmission spectrum which reflects this. If no coupling occurs, there is no change in the wavelength transmission spectrum. Murphy, column 6, lines 52-67.

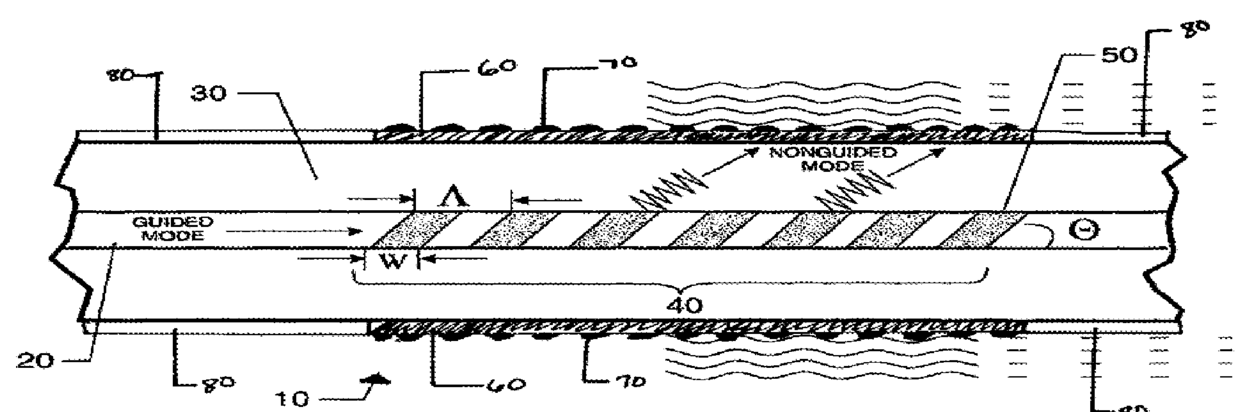

FIG. 1

Murphy explains that when the exposed active sites 70 contact a specific chemical or biological agent, there is a change in the density of the coating which alters the cladding mode's effective refractive index. This change effects a change in the coupling conditions of the guided modes to the non-guided modes and causes a shift in the position of the resonance absorption band. The coupling wavelength shifts are indicative of refractive index changes which are directly related to changes in the coating 60 itself. Thus, the sensing mechanism of Murphy is different from that of SPR or fluoroscopy. Moreover, long period gratings without reactive coatings are sensitive to all refractive index changes that occur in the test specimen. Thus, the reactive coating 60 allows the sensor to be environmentally specific. Murphy, column 6, line 6 through Column 7, line 12.

Murphy also mentions that for those reactive coatings 60 which are chemically reactive and have exposed active sites, the orientation of the exposed active sites is controlled in several ways. One method which is used to control the orientation of active sites for antibody-antigen complexes is to use low molecular weight species. It was discovered by Murphy that the antibodies used by Tran et al. failed to be operable because of the large molecular weights involved. As the antibodies bound with the target molecules, the refractive index of the coating became too large to be of any use. Thus, in order to solve this problem, Murphy uses a lower molecular weight species to coat the cladding 30 and allows for the orientation of the antibody to be away from the fiber. Another method is to provide a coating 60 with active sites which are bound within the coating instead of directly to the fiber. Murphy, column 7, line 64 - column 8, line 12.

The Examiner admits that Murphy fails to describe or teach a second filter without detection molecules; comparing first filter measurements to second filter measurements, and that the first and second filters are porous Bragg gratings. The Applicants also point out that Murphy also fails to describe or teach measuring an optical property of a third filter which is not exposed to the first sample; the third filter comprising a porous Bragg grating; and comparing the measured optical property of the third filter to the measured optical property of the first and second filters to determine a presence of spurious signals caused by the environment, as recited in amended independent Claim 1.

Ridgway

To address the several deficiencies of Murphy, the Examiner relies upon Ridgway. Ridgway describes how nonspecific effects can be canceled using a special modification to a Mach-Zhender (M-Z) interferometer 100 as illustrated in Figure 1A reproduced below for antigen detection. In this figure, antibody molecules (Ab's) are first attached to both arms 116, 118 of the interferometer 100. The reference arm 118 of the interferometer 100 is then irradiated with ultraviolet light through a photo mask. This irradiation deactivates the antibody to produce an Ab layer 114 on reference arm 118.

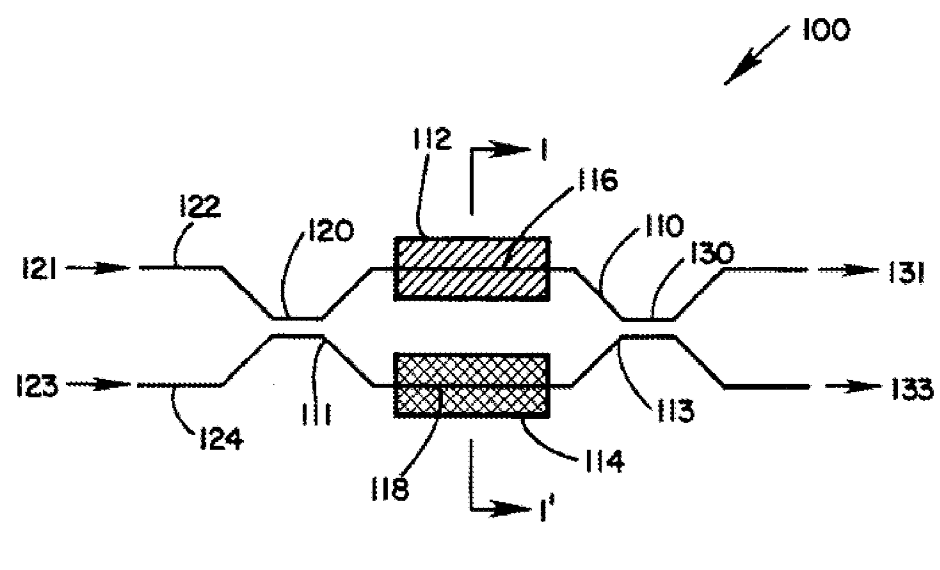

FIG. 1A

Because of the deactivation, specific binding by the antigen (anti-Ab) will not occur on the second arm 118. Therefore, specific binding only occurs on the active interferometer arm 116. All other effects occur on both arms 116, 118. Since the M-Z interferometer 100 measures a change in index between the two arms, only the change due to specific binding will cause a change in M-Z output. All other (i.e., nonspecific) effects will be canceled. Ridgway, column 8, lines 10-27.

The Examiner admits Ridgway, like Murphy, fails to describe or teach each filter comprising a Bragg grating. The Applicants also point out that that Murphy also fails to describe or teach measuring an optical property of a third filter which is not exposed to the first sample; the third filter comprising a porous Bragg grating; and comparing the measured optical property of the third filter to the measured optical property of the first and second filters to determine a presence of spurious signals caused by the environment, as recited in amended independent Claim 1. One of ordinary skill in the art recognizes that that while the second arm 118 of Ridgway is deactivated meaning that it will not bind with the antigert as the active interferometer arm 116, the second arm 118 is still exposed to any samples contained within a working fluid, as noted above ("…all other effects occur on both arms 116, 118").

Sailor

To address the deficiencies of both Murphy and Ridgway, the Examiner relies upon Sailor. Sailor describes a sample analysis device 8 illustrated in Figure 1 which is reproduced below. The device includes a porous thin film 10 enclosed in a sample chamber 12. The chamber 12 provides a sealed and controlled environment for analysis. Its construction may vary depending on the setting in which it will be employed, to include, for example, means such as insulation to provide isolation from an external environment. The porous thin film 10 is structured to be stable in the presence of a type of sample to be analyzed, i.e., particular gases or liquids of interest, and to produce time-varying reflectivity at an illumination wavelength as a gas condenses or a liquid diffuses in the pores of the porous thin film 10. The porous thin film 10 may be formed in or on any suitable substrate. Sailor, paragraph [0014].

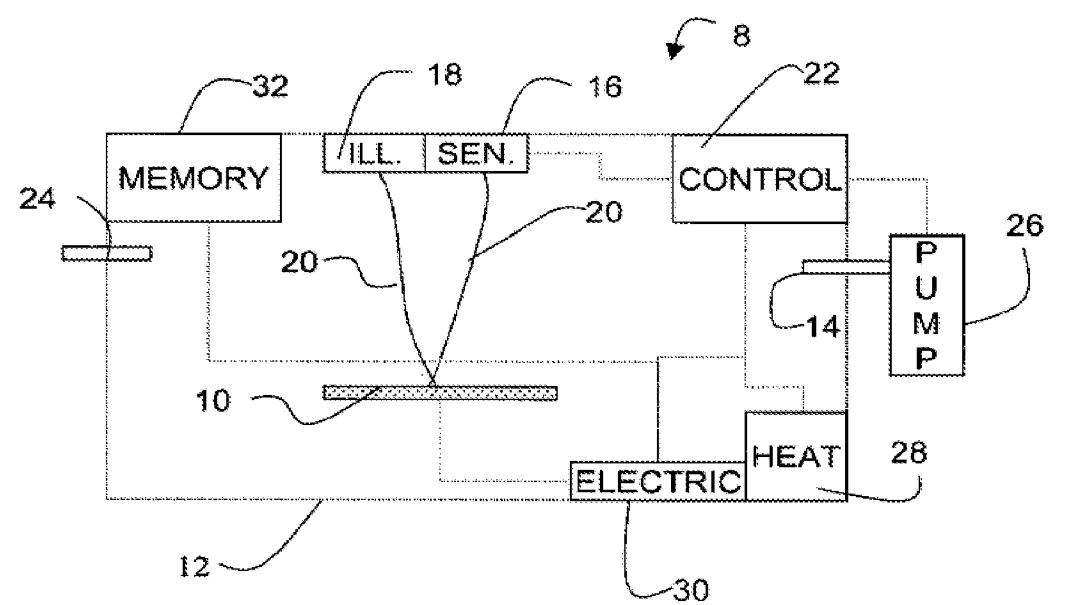

FIG. 1

Sailor explains that a sample is introduced into the chamber 12 through an inlet 14 and interacts with the pores of the porous thin film 10. As the interaction proceeds, time-varying reflectivity data can be obtained by a light sensor 16 disposed to detect reflections caused by an illumination source 18. The light sensor 16 and illumination source 18 may optically communicate with a surface of the porous thin film 10 via optical fibers 20. The light sensor 16 and illumination source may be within or outside of the chamber 12, so long as an optical path to the porous thin film is provided. Certain types of illumination sources, e.g. semi-conductor lasers, LEDs, etc., are more suitable for a solid state within-chamber arrangement, while others, e.g., a tungsten lamp, are more suited for an outside chamber arrangement. Sailor, paragraph [0014].

Sailor mentions that the porous thin film 10 may also comprise a multilayer thin film, such as a porous silicon Bragg reflector. In the case of a Bragg reflector embodiment, the presence of a sample in the pores similarly modifies the average refractive index of the film 10, and a shift of the Bragg peak may be sensed and can be fit to predetermined characteristic data to identify an analyte forming a sample or a part of a sample. Sailor, paragraph [0021].

Sailor, like Murphy and Ridgway, fails to teach or describe measuring an optical property of a third filter which is not exposed to the first sample; the third filter comprising a porous Bragg grating; and comparing the measured optical property of the third filter to the measured

optical property of the first and second filters to determine a presence of spurious signals caused by the environment, as recited in amended independent Claim 1.

Since the cited references in this Office Action fail to teach each and every element claimed in this application, especially those in amended independent Claim 1, the Office has failed to make a case for obviousness under 35. U.S.C. §103(a). Therefore, the undersigned representative believes amended independent Claim 1 and all claims depending therefrom to be allowable over the cited art. Accordingly, the undersigned representative requests the rejection of independent Claim 1 and its corresponding dependent claims be reconsidered and withdrawn.

Rejection of Independent Claim 10

It is respectfully submitted that Murphy, Sailor, and Ridgway, individually or in view of each other, fail to describe, teach, or suggest the combination of: (1) a collector system for collecting the sample from an environment; (2) a transfer system for adding the sample to a working fluid; (3) a dispenser system for introducing the working fluid, including the sample, to a detector system; and (4) a detector system comprising at least one detector module that includes: (5) at least a first optical grating, a second optical grating, and a third optical grating, (6) wherein the first optical grating, the second optical grating, and third optical grating are porous Bragg gratings, (7) further wherein the first optical grating contains at least one detector molecule for binding the at least one target agent thereto and the second optical grating does not contain a detector molecule for binding the at least one target agent thereto, (8) the third optical grating being isolated and not in contact with the working fluid; (9) at least a first measuring device for measuring an optical response of the first optical grating after contact with the working fluid, including the sample, (10) at least a second measuring device for measuring an optical response of the second optical grating after contact with the working fluid, including the sample, (11) at least a third measuring device for measuring an optical response of the third optical grating, and (12) a processor for comparing the measured optical response from the at least a first measuring device to the measured optical response from the at least a second measuring device to determine a presence of the at least one target agent, (13) for comparing the measured optical response from the third filter to the measured optical response from the first and second filters to determine a presence of spurious signals caused by surroundings of the sensor, as recited in amended independent Claim 10.

Similar to independent Claim 1, the three references relied on by the Examiner fail to describe or teach at least a third measuring device for measuring an optical response of the third optical grating, and a processor for comparing the measured optical response from the at least a first measuring device to the measured optical response from the at least a second measuring device to determine a presence of the at least one target agent, for comparing the measured optical response from the third filter to the measured optical response from the first and second filters to determine a presence of spurious signals caused by the environment.

Since the cited references in this Office Action fail to teach each and every element claimed in this application, especially those in amended independent Claim 10, the Office has failed to make a case for obviousness under 35 U.S.C. §103(a). Therefore, the undersigned representative believes amended independent Claim 10 and all claims depending therefrom to be allowable over the cited art. Accordingly, the undersigned representative requests the rejection of independent Claim 10 and its corresponding dependent claims be reconsidered and withdrawn.

Rejection of Independent Claim 20

It is respectfully submitted that Murphy, Sailor, and Ridgway, individually or in view of each other, fail to describe, teach, or suggest the combination of: (1) a first and second inlet reservoir for receiving a working fluid containing the sample therein; (2) a first micro-fluidic channel integrally connected to the first inlet reservoir; (3) a second micro-fluidic channel integrally connected to the second inlet reservoir; (4) a first optical grating physically integrated with the first micro-fluidic channel and a second optical grating physically integrated with the second micro-fluidic channel, (5) wherein the first optical grating and the second optical grating comprise porous Bragg gratings, (6) further wherein the first optical grating includes at least one detector molecule for binding the target agent within the sample thereto and the second optical grating does not include a detector molecule for binding the target agent within the sample thereto; (7) a third optical grating which is isolated from the working fluid, (8) the third optical grating comprising a porous Bragg grating; and (9) at least one outlet reservoir physically integrated with the first and second micro-fluidic channels for removing the working fluid containing the sample from the detector module in order to re-use the working fluid with another sample, as recited in amended independent Claim 10.

Similar to independent Claim 1, the three references relied on by the Examiner fail to describe or teach a third optical grating which is isolated from the working fluid, and the third optical grating comprising a porous Bragg grating.

Since the cited references in this Office Action fail to teach each and every element claimed in this application, especially those in amended independent Claim 20, the Office has failed to make a case for obviousness under 35 U.S.C. §103(a). Therefore, the undersigned representative believes amended independent Claim 20 and all claims depending therefrom to be allowable over the cited art. Accordingly, the undersigned representative requests the rejection of independent Claim 20 and its corresponding dependent claims be reconsidered and withdrawn.

Rejection of Dependent Claims 4-9, 11-13, 15-19, and 21-32 Under 35 U.S.C. §103(a)

Since Claims 4-9, 11-13, 15-19, and 21-32 are dependent on independent Claims 1, 10, and 20 and the Office has failed to meet the burden to support a showing of obviousness with regard to amended independent Claims 1, 10, and 20, the Office similarly fails to meet the burden of obviousness with respect to dependent Claims 4-9, 11-13, 15-19, and 21-32. Therefore, it is respectfully requested that the rejection of dependent Claims 4-9, 11-13, 15-19, and 21-32 under 35 U.S.C. §103(a) be reconsidered and withdrawn.

CONCLUSION

The undersigned believes that claims in this application are allowable over the cited prior art and respectfully requests a notice of allowance to this effect. Should the Examiner determine that any further action is necessary to place this application into better form, the Examiner is encouraged to telephone the undersigned representative at the number listed below. In addition, if any additional fees are required in connection with the filing of this response, the Commissioner is hereby authorized to charge the same to Deposit Account No. 504402.

Respectfully submitted,

Date: February 13, 2008

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